

Activity 5

The Sun and Its Effects on Your Community

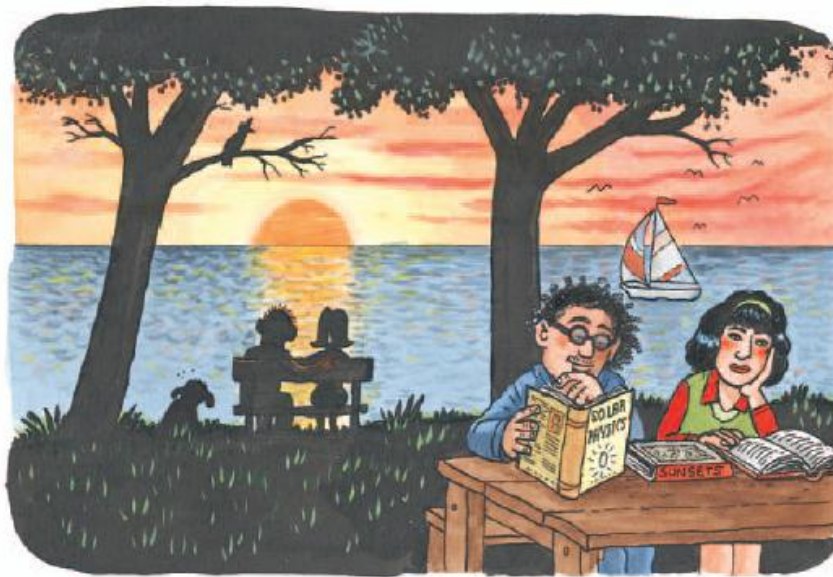
Think About It

Date

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- In what ways does solar radiation benefit you?
- In what ways can solar radiation be harmful or disruptive?



WHAT DO YOU THINK?

Activity 5

The Sun and Its Effects on Your Community

Investigate

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1. Construct a graph.

1c. Describe any pattern
you find in the sunspot
activity.

Activity 5

Digging Deeper

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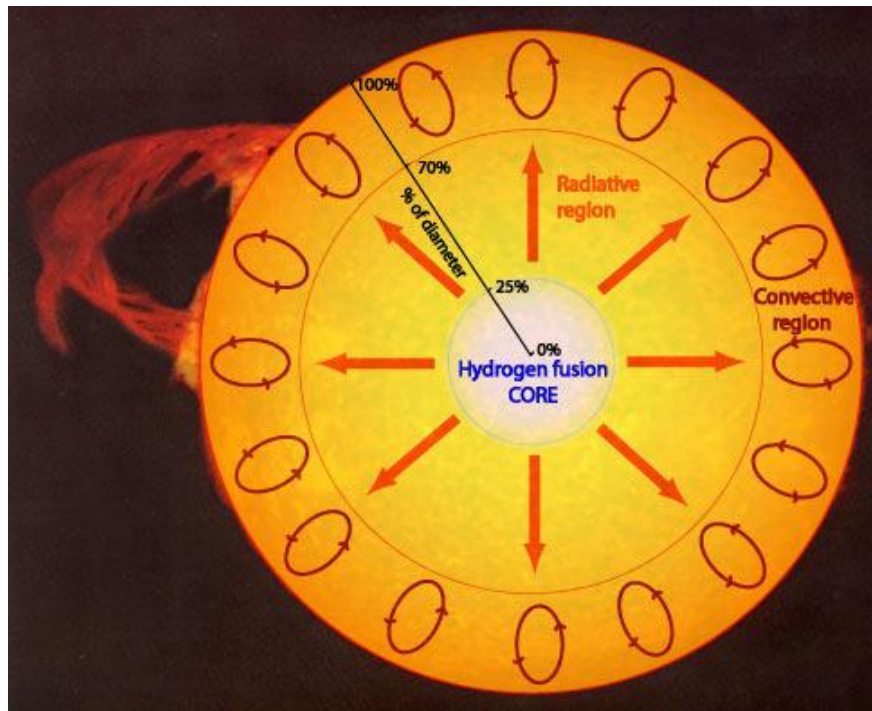
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<http://www.brainpop.com/science/space/sun/>

The sun's core

its central region where
nuclear fusion occurs



The core is the source of all the
sun's energy

Photosphere

the lowest layer of the sun's
atmosphere and the layer that
gives off light

The photosphere is often called
the surface of the sun

Temperatures here are about 6000 K

Chromosphere

the layer of the sun's atmosphere above the photosphere

This layer extends upward about 2000 km above the photosphere and produces much of the sun's ultraviolet radiation

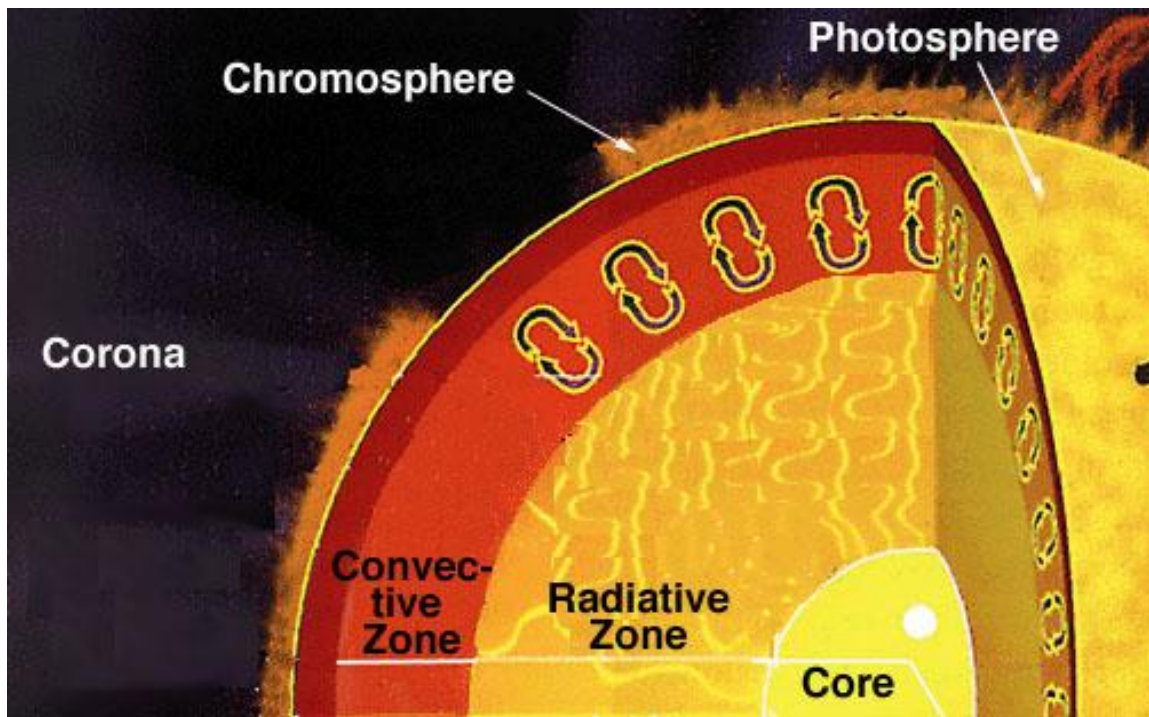
Corona

the largest layer of the sun's atmosphere

It extends millions of kilometers into space

Temperatures in the corona are as high as 2 million K

The charged particles of solar winds escape from the corona



Energy source

the sun is the Earth's main external source of energy

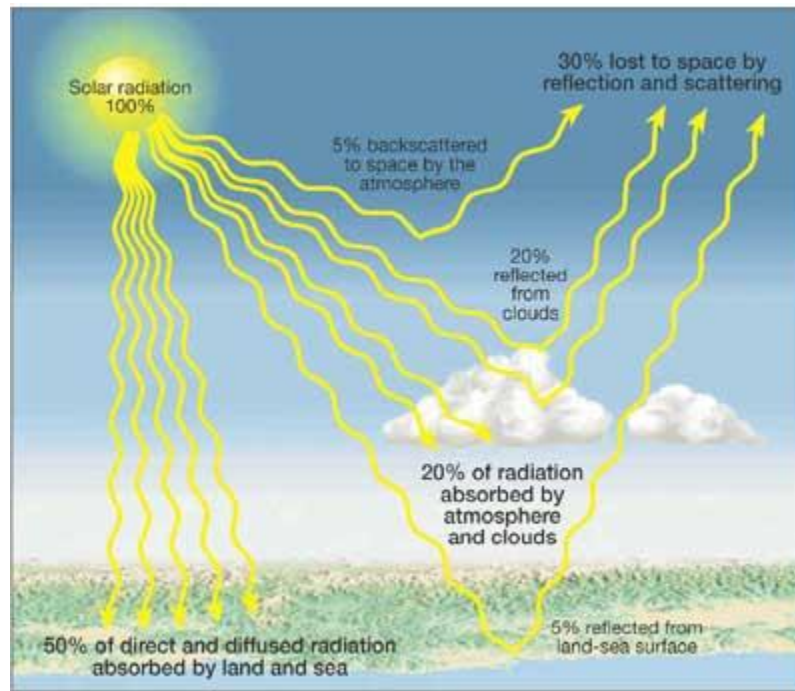
- About half of the energy is absorbed by the Earth's surface
- Some is absorbed by the atmosphere
- The rest is reflected or scattered back into space by the Earth or clouds

Albedo

how much radiation is reflected by a surface (percent)

A perfect mirror would have an albedo of 100%, while a black hole would have an albedo of 0%

Earth's albedo is 0.30 = 30% of the light is reflected

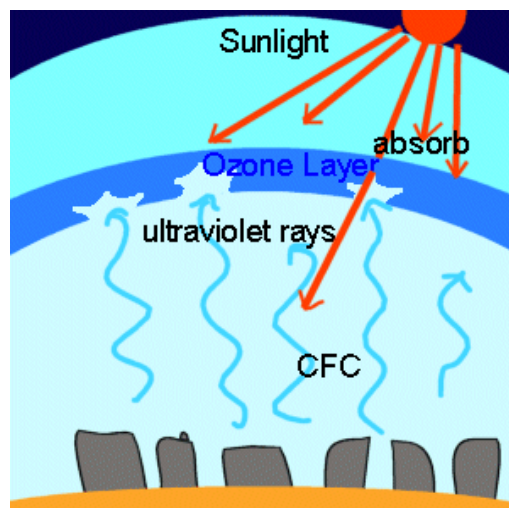


Harmful solar radiation

ultraviolet (UV) radiation, which causes skin damage

Ozone

O₃ gas found in the upper atmosphere shields the Earth from much of the sun's harmful UV rays



Less ozone means that more UV radiation reaches Earth, increasing the danger of skin damage

Sunspots

areas of the sun's surface that appear dark because they are cooler



The sun rotates

by studying sunspots, scientists know the sun rotates

It does not rotate as a solid body, like the Earth

It rotates faster at the equator than at the poles

Sunspots at the equator take about 25 days to complete one rotation, but near the poles, they take about 35 days

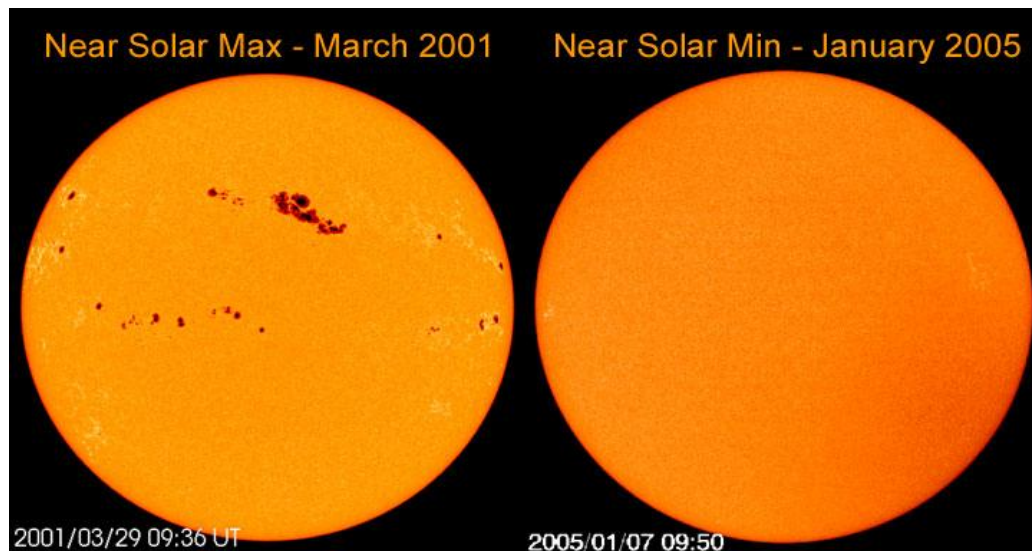
http://www.windows.ucar.edu/tour/link=/sun/atmosphere/sun_rotate_anim_jan2005.html&edu=high

Sunspots are not permanent—they appear and disappear over periods of days, weeks or months

Sunspot maximums times when many large sunspots occur

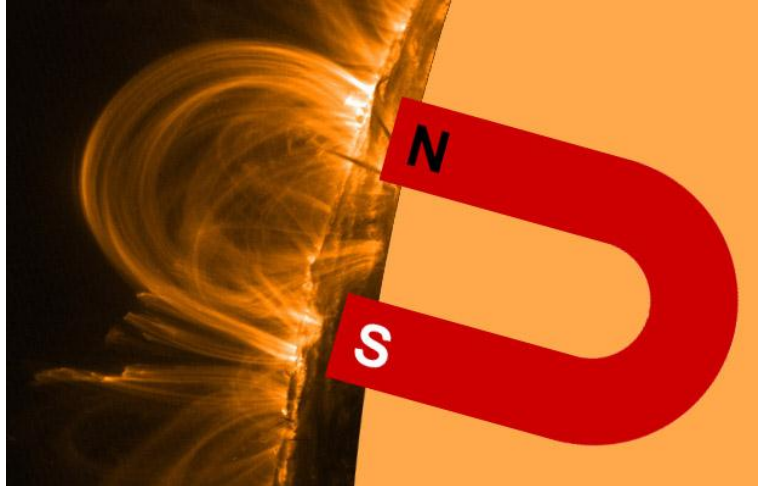
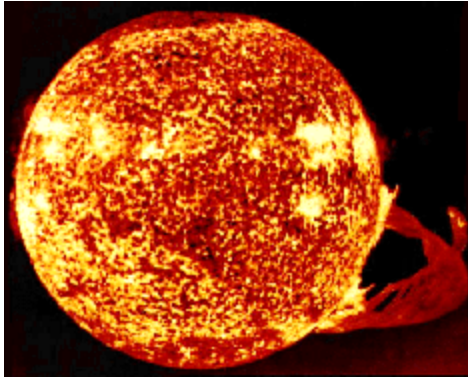
They occur about every 10 to 11 years

Sunspot minimums occur in between sunspot maximums



Prominences huge arching columns of gas

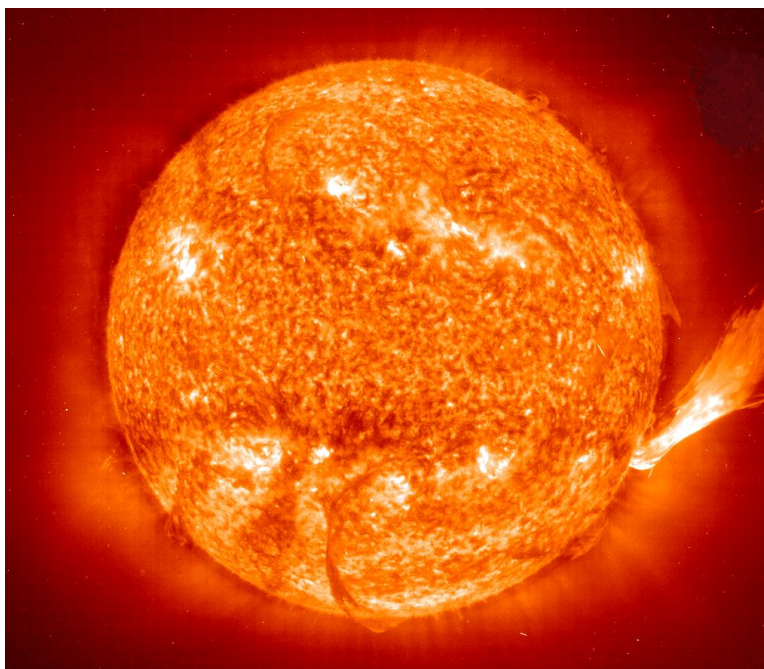
Prominences may be caused by the intense magnetic fields associated with sunspots



http://antwrp.gsfc.nasa.gov/apod/image/0810/304erupt_rt_crop1024_med.mov

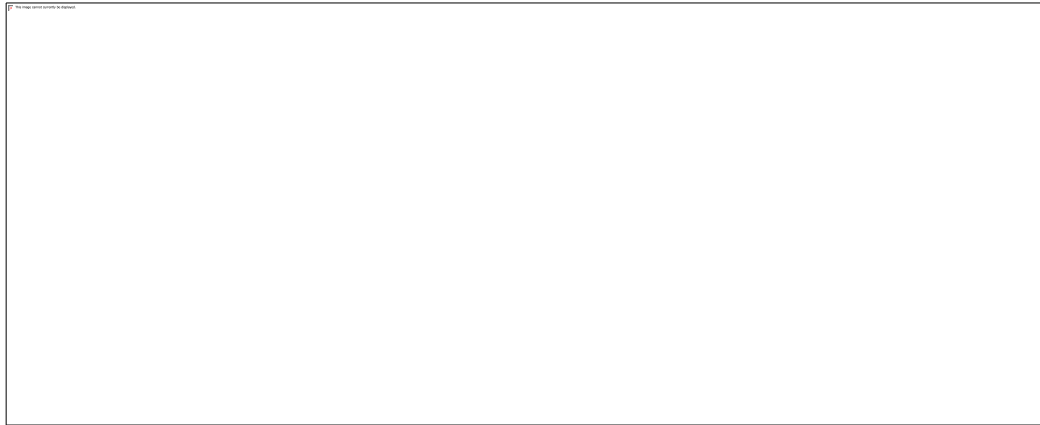
Solar flare

violent eruption that occurs when gases near a sunspot brighten suddenly, shooting outward at high speed



http://www.daviddarling.info/encyclopedia/S/solar_flare.html

<http://www.youtube.com/watch?v=eOjWTNGVvFU&feature=related>



Solar wind

the flow of charged particles from the sun

Is responsible for “space weather”—the environment outside our planet

Can disrupt radio signals by disturbing the upper layers of the atmosphere

<http://www.pond5.com/stock-footage/90023/radiant-sun-rays-solar-wind-digital-animation.html>

Aurora

light created when high-energy particles from the solar wind are captured by Earth's magnetic field and interact with Earth's atmosphere near the poles



Aurora borealis the northern lights

Aurora australis the southern lights

http://www.southernskyphoto.com/aurora/sept_11_2005.htm

<http://www.simg.de/astroimages/auroras/031120/02/index.html>

<http://solar-heliospheric.engin.umich.edu/hjenning/November24,2001.html>

Our sun is average compared to other stars:

1. it is middle-aged
2. shines with average brightness
3. has average temperature
(medium-hot stars are yellow in color)
4. is of average size

Activity 5

Check Your Understanding

Date

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1. Describe the three main layers of the sun's atmosphere.

2. How does Earth's ozone layer benefit life? How could a reduction in ozone affect life on Earth?

3. Describe at least three ways our sun is similar to other stars.

4. Explain how albedo affects temperatures on an area of Earth.